

WHAT IS CLAIMED IS:

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5 1. A projection exposure apparatus, comprising:
an illumination optical system for
illuminating a reticle having a pattern, with
illumination light supplied from a light source;
a projection optical system for projecting
the pattern onto a substrate by use of the
illumination light;
measuring means for measuring angular
10 distribution of the illumination light; and
first adjusting means for changing angular
distribution of the illumination light, entering said
projection optical system, on the basis of measurement
by said measuring means and in accordance with a
15 distance from an optical axis.

20 2. An apparatus according to Claim 1, wherein
said first adjusting means serves to move an optical
element in a portion of of said illumination optical
system along an optical axis direction, to thereby
change the angular distribution of illumination light,
entering said projection optical system.

25 3. An apparatus according to Claim 2, wherein
said illumination optical system includes an optical
integrator for producing secondary light sources with
illumination light supplied from the light source, and

masking means for restricting an illumination range to be defined on a surface which is to be illuminated with the illumination light, and wherein said optical element is disposed between said optical integrator and said masking means.

4. An apparatus according to Claim 1, further comprising second adjusting means for tilting beams of the illumination light entering said projection optical system, in the same direction.

5. An apparatus according to Claim 4, wherein said second adjusting means has one of (i) a function for tilting an optical element in a portion of said illumination optical system, (ii) a function for moving said optical element in a direction orthogonal to the optical, and (iii) a function for inserting and extracting said optical element to and from the light path, to thereby tilt the beams of illumination light entering said projection optical system in the same direction.

6. An apparatus according to Claim 5, wherein said illumination optical system includes an optical integrator for producing secondary light sources with illumination light supplied from the light source, and wherein said optical element is disposed at a light

entrance side of said optical integrator.

5 7. An apparatus according to Claim 1, further comprising correcting means for correcting a change in illuminance distribution on a surface to be illuminated, resulting from changing the angular distribution of the illumination light with said first adjusting means.

10 8. A device manufacturing method, comprising the steps of:

lithographically transferring a pattern of a reticle to a wafer by use of an exposure apparatus as recited in Claim 1; and

15 developing the wafer having the pattern transferred thereto.

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